



Enhancing Outreach of EO Products **- *Sharing Indian Experience***

Vinay K Dadhwal

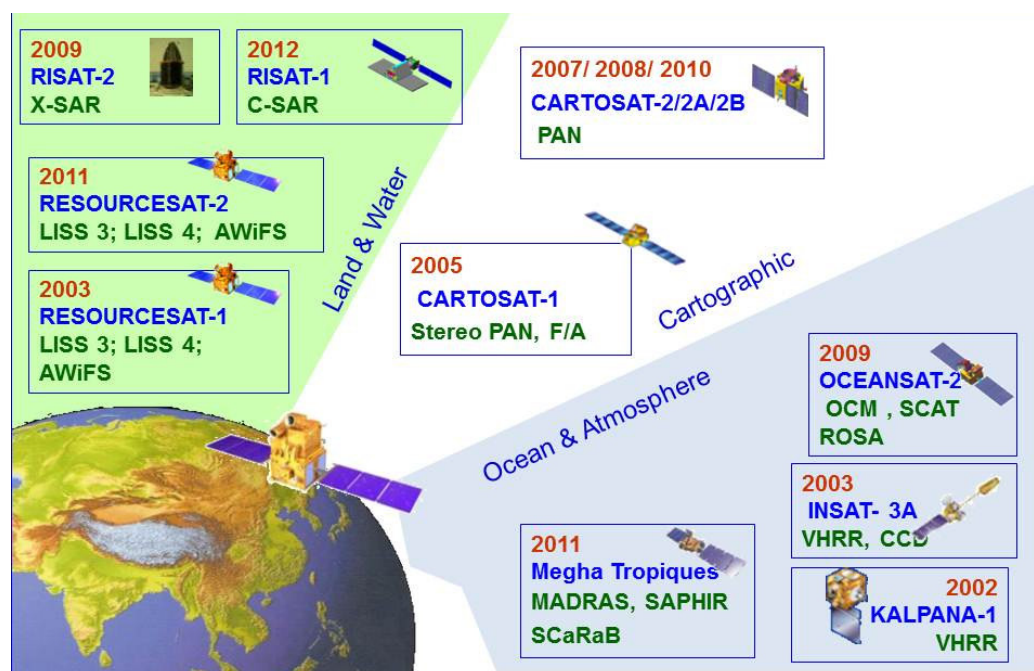
Director

National Remote Sensing Centre (NRSC), ISRO

Hyderabad, INDIA

Motivation

- Demonstrated applications of EO for natural resources, infrastructure, planning & disaster management support
- ISRO Operates ten EO missions



- Use of EO derived data, products & information must be enhanced to maximum possible extent for realizing full potential of EO applications

Barriers to full EO utilization

- EO data use not internalised/ institutionalized
- Lack of expertise in information extraction from EO data
- Interest in output/ service not the EO analysis
- Data not always available in-time
- Maps & atlases not ubiquitous or easy to use
- Users own data not geographically linked
- Difficulty in ordering data or searching for required RS-based product
- Barriers to infrastructure creation

**Focused
attention
required to
overcome
these barriers**



Possible Solutions

BARRIERS

- Institutionalization
- Expertise
- Use centric approach
- Timely Access
- Map/Product Access
- User Data incompatibility
- Data discovery
- Lack of infrastructure

ISRO EFFORTS

- Mandated Organizations
- Simplify, Project-linked training
- Create usable products
- Establish Capacity for timely delivery
- Web delivery - BHUVAN
- New geo-linked Information Systems
- Data portal for metadata search
- Web platform for open use



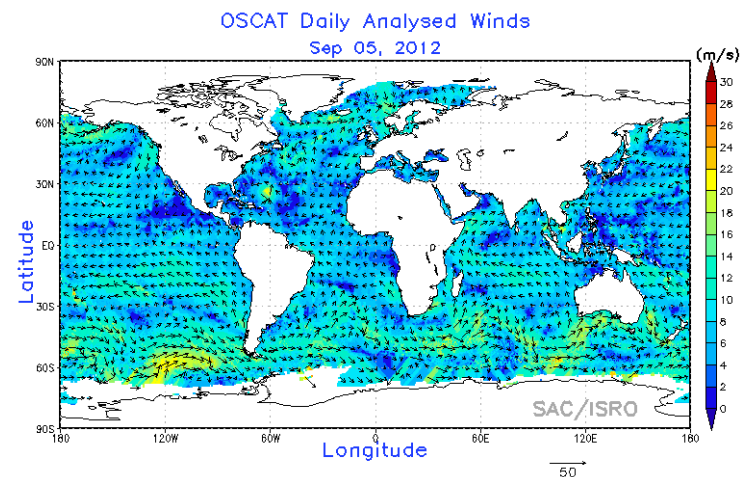
Organizations & Capacity Buidling

- State Governments & Ministries have own RS Application Center/Unit
 - Min Agriculture established Mahalanobis National Crop Forecast Centre (MNCFC) in New Delhi in April 2012
- Major EO Applications programs have large training program on use of outputs/ products of EO(participants > 2000)
 - Rajiv Gandhi National Drinking Water Mission
 - National Urban Information System
 - Space Input Support for Decentralised Planning (SiSDP)
 - Rajiv Gandhi Awas Yojana (RAY)
 -

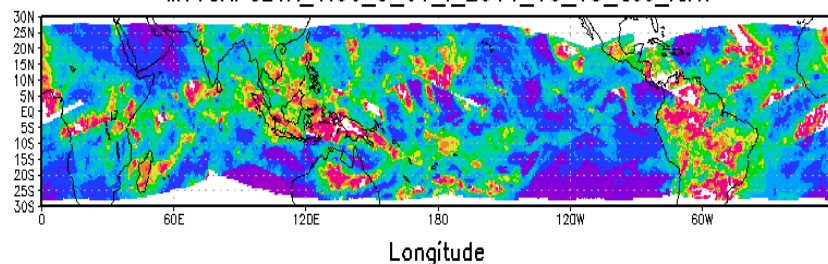
Geophysical Products

• GLOBAL PRODUCTS

- Scatterometer (OSCAT) daily, NRT
 - Backscatter, WV, sea ice
- Ocean Color Monitor (OCM), 8day
 - Water leav radiance, chl
- Meghatropiques Products (equatorial)



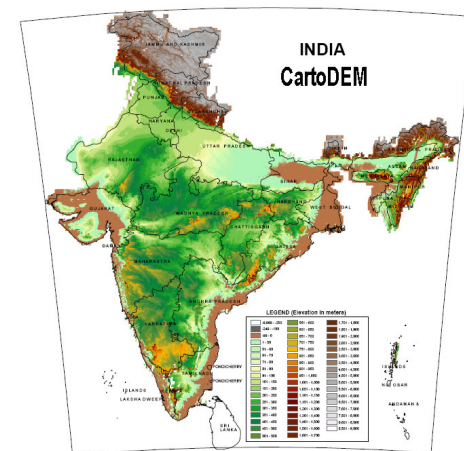
LAYER AVERAGE RELATIVE HUMIDITY (550-400)mb
MT1SAPSL1A_1.00_9_01_I_2011_10_15_asc_larh



SAPHIR RH

• INDIAN REGION

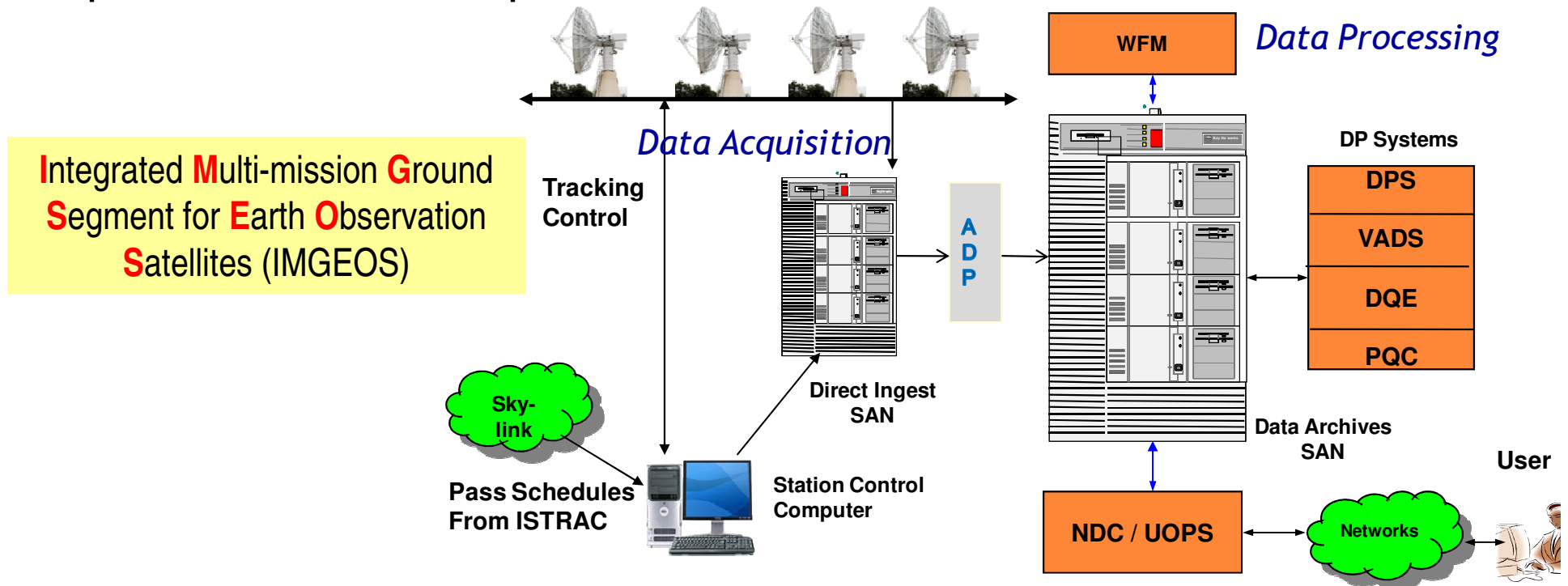
- Cartosat-1
 - DSM (30m: OPEN), (10m:)
- Resourcesat-2 (Experimental)
 - Water Spread
 - Snow Cover





IMGEOS – Timely delivery of products

- IMGEOS for multi-mission acquisition, processing & delivery
- Full acquisition processing with emergency product 1 hr after pass and standard product in 24 hr

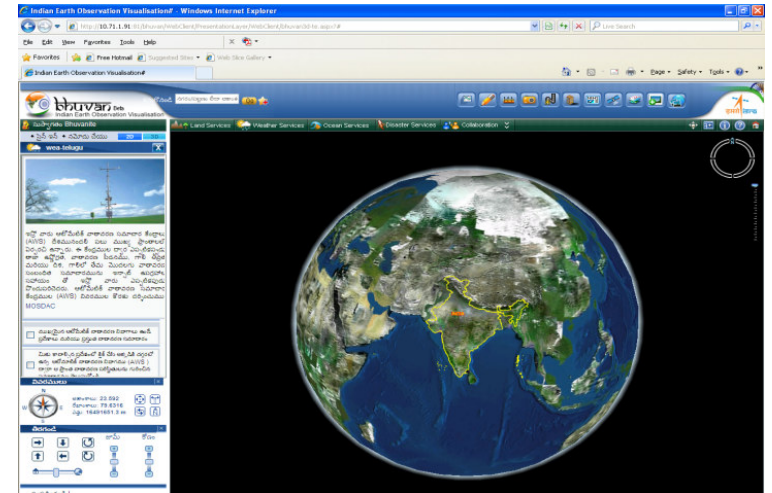
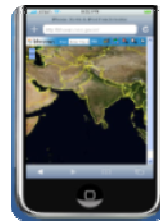


- Full Pass Processing
- Off the shelf products
- Web order, monitor, FTP

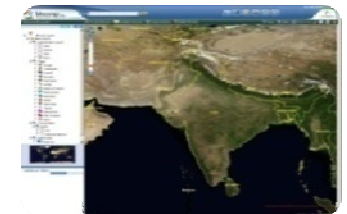
- Antarctica Ground Station
- SSR, Svalbard-network

BHUVAN – *making EO accessible*

- 3D and 2D visualization
- Multilingual (English, Tamil, Telugu, Hindi)
- Lighter mobile version
- OGC compliant, API available



- Hosts Open EO Archive for free downloads



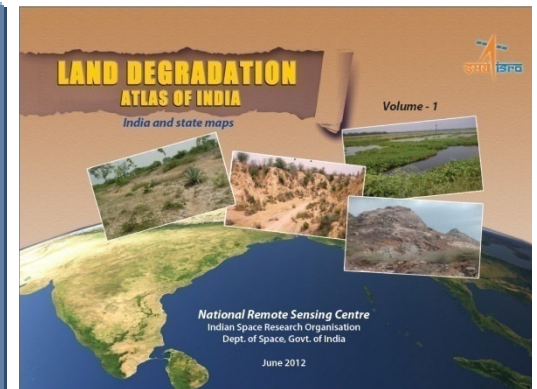
CARTODEM
LISS-III
AWIFS

Total Downloads
since Sep 2011
approx 100,000

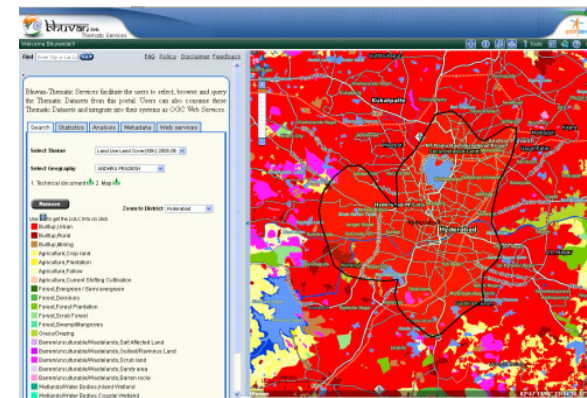
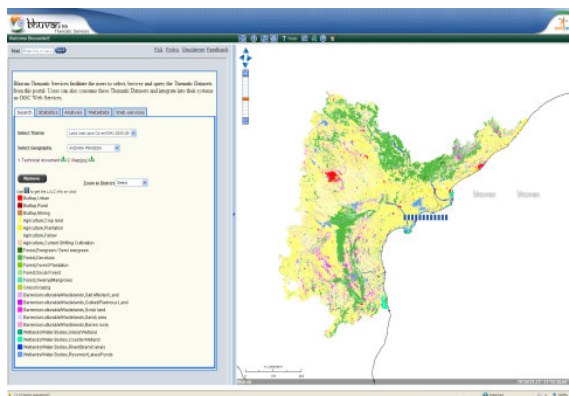


Maps & Atlas as GIS layer on Web

- National-scale multi-thematic mapping by ISRO (Land Cover, Land Degradation, Wasteland, ...) traditionally followed by Atlas & Map circulation to national & state agencies



- BHUVAN Thematic Service
- Allows to select, browse and query Thematic Datasets, also consume the Thematic Datasets & integrate into their GIS as 'OGC Web Services'.



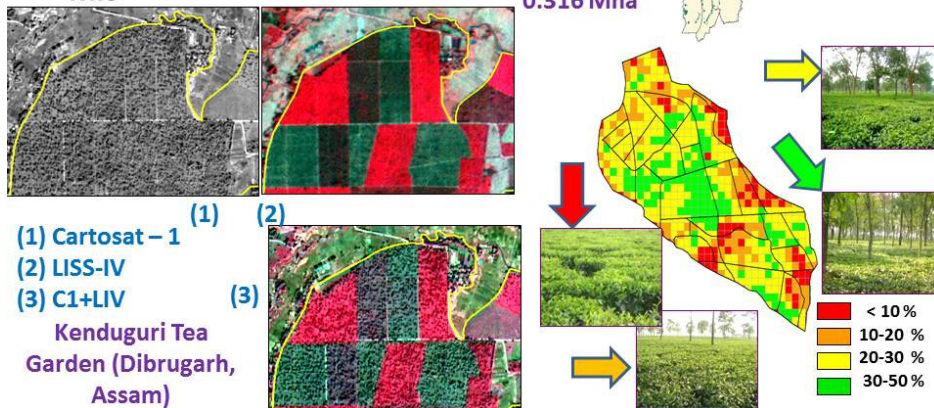
Creating geo-linked Information Systems

- Tea-GIS linked to MIS
- USER: Tea Board
- EO derived Tea Garden inventory, Tree Cover linked to Tea MIS

- Water Resource Information System
- User: Min. Water Resources

Tea Gardens Inventory & Management

- Tea growing area, Tea Garden GIS
- Monitoring uprooting, replnting
- Growth , shade tree analysis
- Site suitability, R&D for EO use
- MIS



India WRIS

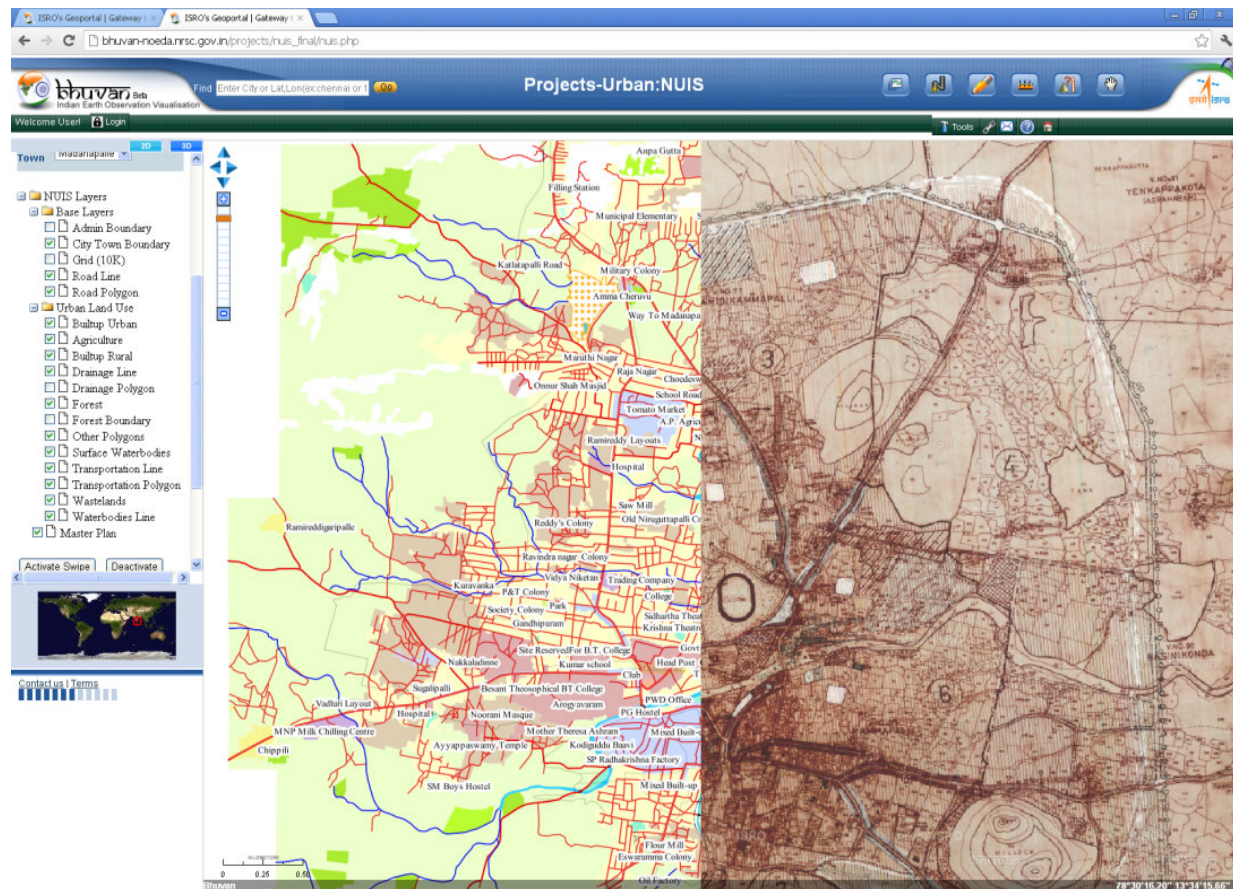


Main & Sub Info. Sys : 12 / 35
 Layers / Attributes : 108 / > 4000
 Six Modules Ver 2.0 in public domain,
 Mar 2012



National Urban Information System : Next Step

- NUIS (PI) covered 152 towns for 1:10k & 1:2k thematic mapping
- To meet challenge of planning for more than 1000 NO PLAN towns, tools being built in BHUVAN to allow access to EO with least infrastructure



Irrigation Infrastructure Monitoring

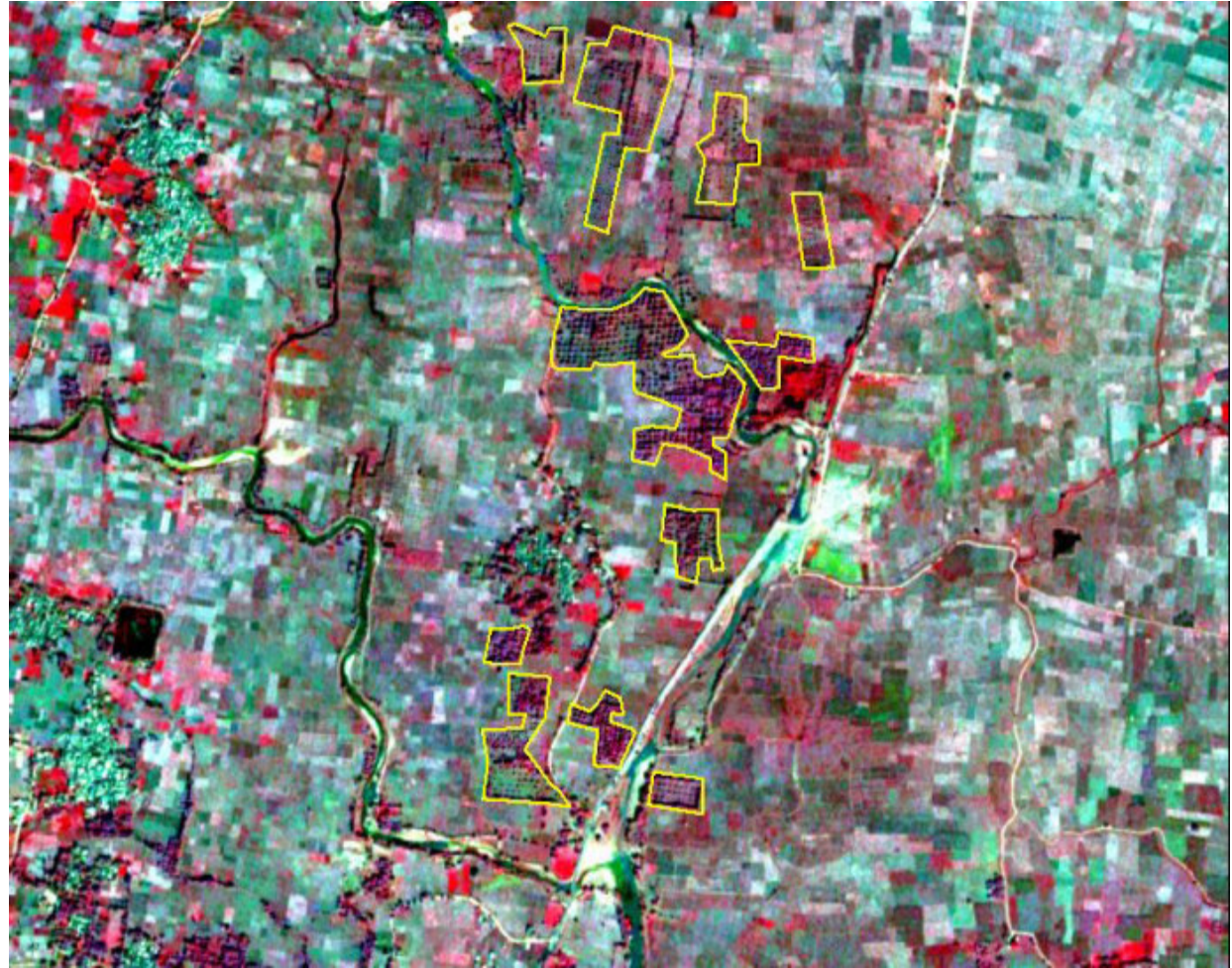
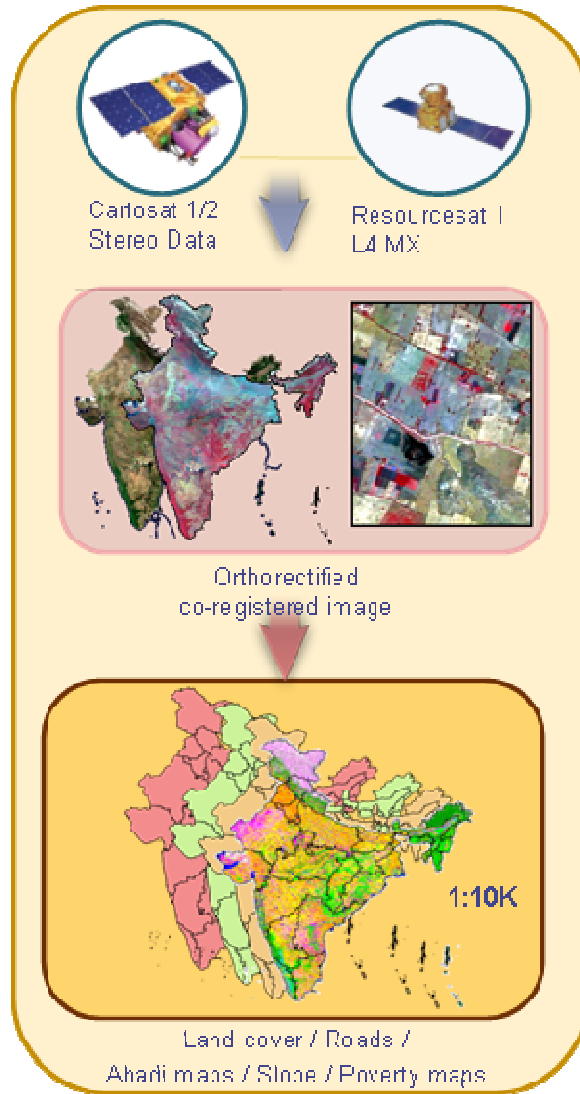
- **Accelerated Irrigation Benefit Program (AIBP) of Min Water Resources supports new irrigation infrastructure**
- Physical progress of AIBP is needed
- Methodology for Cartosat-1 based physical progress monitoring
- **53 AIBP Phase I : Demonstration**
- **50 AIBP Phase II : Operational**
- Next Phase : User own monitoring capability in BHUVAN

AIBP: Accelerated Irrigation Benefit Programme (CWC)

- Mapping irrigation infrastructure
- Assessment of IP created
- Percentage completion
- Critical gap areas



Space-based Information Support for Decentralized Planning



Agricultural plantations: Meerut

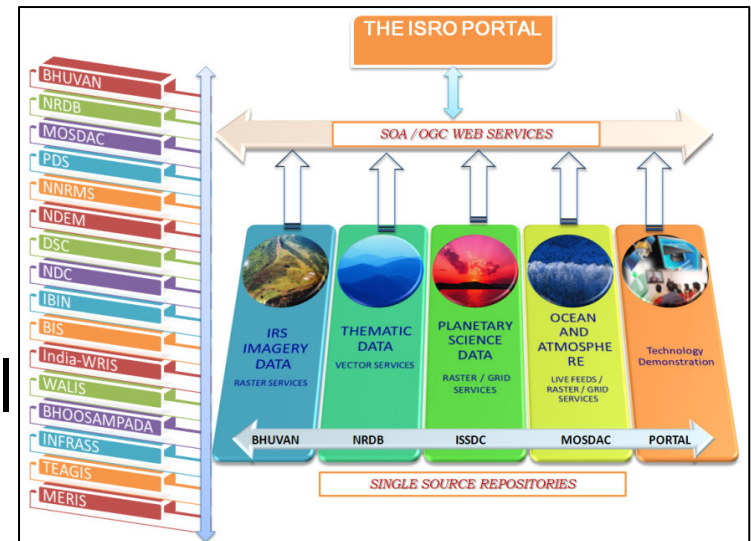
Space-based Information Support for Decentralised Planning

Simplify data & product search

- CRM software to aid users in data ordering & monitoring status of data
- ISRO Data Discovery Portal where all data & products can be searched:

dataportal.isro.gov.in

- Metadata of Open data archive in Indian NSDI 2.0 format, also cross-listed in NSDI portal





Thank You

<http://bhuvan.nrsc.gov.in>
<http://www.india-wris.gov.in>
<http://www.nrsc.gov.in>
<http://www.isro.gov.in>